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**Remarks**A. Period For Reply

A shortened statutory period was set to expire three months from the Office Action of February 7, 2005. Three months from February 7, 2005 is May 7, 2005. May 7, 2005 falls on a Saturday. This Amendment and Remarks is being filed on or before Monday, May 9, 2005.

B. Status

The Office Action was non-final.

C. Disposition Of Claims

Claims 2-3 and 5-8 are pending.

D. Application Papers

As to drawings, there are no drawings in this case.

E. Priority under 35 U.S.C. §§ 119 and 120

Acknowledgment of the claim for foreign priority was made in the Office Action dated February 7, 2005. This is appreciated.

Acknowledgment of the receipt of the priority document was made in the Office Action of February 7, 2005. This is appreciated.

As to domestic priority, this case does not claim domestic priority.

F. Attachments

Applicants filed two PTO-1449 forms in this application, one with the filing of this case on August 1, 2003 and one on November 4, 2003. Each of these PTO-1449 forms has been signed by the Patent Office, each of the

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reference listings on the forms has been initialed, and each of the forms was returned with the Office Action of February 7, 2005. This is very much appreciated.

G. Basis for amendments to the specification and claims

Paragraph [0121] has been amended to correct a spelling error. Basis for the change from "while" to --white-- is found in the same paragraph [0121] where it is described that a white powder is obtained.

Claim 2 has been amended to incorporate all of the limitations of claim 1 (which has been canceled).

Claim 2 has further been amended to incorporate all of the limitations of claim 4 (which has been canceled).

Claim 2 has further been grammatically amended by inserting the word "after." This amendment was suggested by the Patent Office.

Claim 5 has been amended to incorporate all of the limitations of claim 1 (which has been canceled).

Claim 5 has further been grammatically amended by inserting the word "after." This amendment was suggested by the Patent Office.

Claim 6 has been amended by inserting the phrase "of 40 to 100 °C." Basis for this amendment is found in the specification at least on page 24, lines 2-3 and page 25, line 26.

Claim 7 has been amended to incorporate all of the limitations of claim 1 (which has been canceled).

Claim 7 has further been grammatically amended by inserting the word "after." This amendment was suggested by the Patent Office.

Claim 8 has been amended to change its dependency from independent claim 1 (which as been canceled) to a multiple dependency upon claims 2 to 7.

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## H. The Office Action

### H.1. Section 1 of the Office Action

In section 1 of the Office Action, it was stated that the lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors, and applicant's cooperation was requested in correcting any errors of which applicant may become aware.

Applicant has found one spelling error. Please see the above noted portion of this paper entitled "Amendments to the Specification."

### H.2. Section 2 of the Office Action

In section 2 of the Office Action, claim 6 was rejected under 35 U.S.C. 112, second paragraph, as being indefinite. The phrase "high temperature" was objected to. In response, "high temperature" has been amended to read "high temperature of 40 to 100 °C." It is therefore respectfully submitted that claim 6 is in compliance with 35 U.S.C. 112, second paragraph.

### H.3. Section 3 of the Office Action

In section 3 of the Office Action, claims 1-8 were rejected under 35 U.S.C. 102(a) as being anticipated by Kubo (US 2002/0198403 12-2002). This rejection is respectfully traversed on the basis of applicant's discussion below in section I. of this paper.

### H.4. Section 4 of the Office Action

In section 4 of the Office Action, claims 2, 5 and 7 were objected to because of the limitation "behind distilling." The Patent Office has suggested the limitation

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of "behind after distilling" and this suggestion has been adopted.

#### H.5. Section 5 of the Office Action

In section 5 of the Office Action, the Office Action was summarized and contact information with the Patent Office was set out.

#### I. Applicant's discussion

Claims 2-3 require a cation-exchange resin, and these claims are first discussed. Claims 5-7 do not require a cation-exchange resin (or any resin), and these claims are next discussed. (Claim 8 is a multiple dependent claim dependent upon claims 2-3 and 5-7).

#### I.1. Claims 2-3

Applicant below discusses four differences between the Kubo reference and independent claim 2 of the present case.

#### I.1.a. First difference: when the ion-exchange resin is used

The Kubo reference describes a method of liquid-phase reaction using a soluble metallic catalyst which comprises causing the soluble metallic catalyst to coexist with an anion-exchange resin during the reaction and conducting the reaction under such conditions that 50% or more of the soluble metallic catalyst is adsorbed onto the anion-exchange resin. Please see published claim 1 of the Kubo reference.

What is the liquid-phase reaction referred to in published claim 1? The Kubo reference describes a liquid-phase reaction as being one selected from the group consisting of an oxidation reaction, a reduction reaction, a

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condensation reaction, an esterification reaction, an amidation reaction, an etherification reaction, a carbonylation reaction, an alkylation reaction, and a hydroformylation reaction. Please see published claim 3 of the Kubo reference.

Thus, the anion-exchange resin of the Kubo reference co-exists with the catalyst during the reaction, and the catalyst is adsorbed onto the anion-exchange resin during the reaction, which reaction may be one of the reactions set forth in published claim 3 of the Kubo reference.

In contrast, independent claim 2 of applicant includes the following time requirements:

wherein the catalyst-recovering step includes the step of causing a cation-exchange resin to adsorb the catalyst as contained in a residue as left behind after distilling off the objective hydroxyalkyl (meth)acrylate from the resultant reaction liquid.

In other words, applicant requires the co-existence and adsorption after the reaction. Allowance of independent claim 2 and its dependent claim 3 is respectfully requested on the basis of this first difference.

I.1.b. Second difference: applicant's targeted body is a residue, not a body having raw reaction materials

In the Kubo reference, the targeted body, in which the anion-exchange resin and catalyst co-exist, is a reaction liquid having raw reaction materials (along with the anion-exchange resin and catalyst). Further, as the reaction proceeds, the targeted body of the Kubo reference includes a reaction product.

On the other hand, independent claim 2 requires the targeted body to be that underlined below:

wherein the catalyst-recovering step includes the step of causing a cation-exchange resin to adsorb the catalyst as contained in a residue as left behind after distilling off the objective hydroxyalkyl (meth)acrylate from the resultant reaction liquid.

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Allowance of independent claim 2 and dependent claim 3 is respectfully requested on the basis of this second difference.

An advantage of this second difference is adsorption efficiency, namely, the recovery ratio of the catalyst, and/or the product purity resultant from the distillation can be enhanced. Please see page 16, line 19 to page 17, line 4 of the present specification.

I.1.c. Third difference: applicant claims a cation-exchange resin while Kubo teaches an anion-exchange resin and while Kubo does not teach a cation-exchange resin as to its specific method

First, the Kubo reference exploits an anion-exchange resin, not a cation exchange resin. For example, published claim 1 of the Kubo reference is as follows:

1. A method of liquid-phase reaction using a soluble metallic catalyst which comprises causing the soluble metallic catalyst to coexist with an anion-exchange resin during the reaction and conducting the reaction under such conditions that 50% or more of the soluble metallic catalyst is adsorbed onto the anion-exchange resin.

Second, an electronic search of the Kubo reference will reveal that the Kubo reference discloses the use of a cation-exchange resin only once and, in this single disclosure, the Kubo reference does not relate the cation-exchange resin to its own method. The single disclosure is reproduced below in its entirety:

[0005] Also known is a technique in which an ion-exchange resin is used to recover a soluble metallic catalyst. Japanese Patent Laid-Open No. 44300/1984 discloses a method in which after phthalic acid is reacted with an epoxy compound with the aid of a chromium compound as a soluble metallic catalyst, the resultant liquid reaction mixture is dissolved in a solvent, e.g., water, and the catalyst is recovered with a cation-exchange resin. Although this method can be used for catalyst recovery, it has drawbacks that use of a solvent is necessary for the recovery and that a special eluent and much labor are required for reusing the catalyst adsorbed onto the cation-exchange resin.

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Such, it is respectfully submitted, teaches away from the use of a cation-exchange resin. In any event, such disclosure does not teach or suggest the requirements of applicant's independent claim 2.

The advantages or merits of applicant's cation-exchange resin are found in applicant's specification on page 17, lines 14-18, which is reproduced below:

Above all, the cation-exchange resins are favorable, and the strongly acidic cation-exchange resins are more favorable, in that: they display a high catalyst-adsorbing ratio, and are so inexpensive as to be economically excellent, and involve little deterioration in the adsorbing and desorbing abilities.

Moreover, applicant claims a cation-exchange resin. Allowance of applicant's independent claim 2 and dependent claim 3 is respectfully requested on the basis of this third difference.

I.1.d. Fourth difference: the anion-exchange resin of the Kubo reference is a catalytic resin; the cation-exchange resin of applicant's is not a catalytic resin

The anion-exchange resin of the Kubo reference is a catalytic resin. Please see paragraph [0053] of the Kubo reference below:

[0053] When a chromium compound (e.g., chromium(III) acetate) is used as a catalyst and an anion-exchange resin of the quaternary ammonium type is caused to coexist therewith from the beginning of the reaction, then chromium(III) ions in a free state are present in the liquid reaction mixture in the initial stage of the reaction. The reaction proceeds due to the catalytic action of the chromium ions and anion-exchange resin. As the concentration of acrylic acid thus decreases, the adsorption of chromium(III) ions onto the anion-exchange resin proceeds. This phenomenon is thought to occur by the following mechanism. The chromium(III) ions are present in the form of a complex containing the anion of acrylic acid as the main ligand. As the acrylic acid concentration in the liquid reaction mixture decreases, the complex moves into the anion-exchange resin in which acrylic acid is present in a higher concentration. Thus, the adsorption proceeds. By merely separating this anion-exchange resin from the liquid reaction mixture after the reaction, the chromium ions can be easily recovered from the reaction product.

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In contrast to the above, applicant's resin is not a catalytic resin (and is further not an anion-exchange resin). Applicant's claimed resin is a cation-exchange resin that does not have a catalytic purpose.

While the third difference above relates to a structural difference (the Kubo reference discloses an anion-exchange resin while applicant claims a cation-exchange resin), the present fourth difference relates to a difference in purpose.

Allowance of independent claim 2 and its dependent claim 3 is respectfully requested on the basis of this fourth difference.

#### I.2. Claims 5-7

##### I.2.a. Independent claim 5

In section 3 of the Office Action, the Patent Office states as follows:

Adsorption occurs under the condition of the reaction with starting acid and product alcohol acting as polar solvents. Kubo discloses (paragraphs [0057]-[0059]) the reaction of acrylic acid with propylene oxide in the presence of chromium acetate as catalyst and anion exchange resin at an elevated temperature of 60 °C. (emphasis added)

Such, however, does not relate to a catalyst-recovery step.

Next, in section 3 of the Office Action, the Patent Office states as follows:

Kubo discloses the isolation and recovery of the chromium catalyst as well. Kubo specifically suggests [0043] separating the resin from the reaction mixture by distillation.

However, in the Kubo reference, including in paragraph [0043] of the Kubo reference, applicant can find no disclosure as to the following requirement of independent claim 5:

wherein the catalyst-recovering step includes the step of mixing a solid with an acid, wherein the solid is a product obtained by applying solid-liquid separation to a mixture of

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the resultant reaction liquid and/or its residue with water and/or an alkali solution, wherein the residue is a residue as left behind after distilling off the objective hydroxyalkyl (meth)acrylate from the reaction liquid.

Allowance of independent claim 5 and its dependent claim 6 is therefore respectfully requested.

I.2.b. Independent claim 7

Section 3 of the Office Action points to paragraph [0044] of the Kubo reference and states as follows:

Kubo further discloses [0044] the addition of fresh starting materials (including acrylic acid) to recovered catalyst (distillation residue).

However, it is respectfully submitted that paragraph [0044] describes an eluted catalyst and not a fresh catalyst as required by independent claim 7. Also, "starting materials" in paragraph [0044] is not a sufficient teaching of a catalyst as required by independent claim 7. For example, it is respectfully submitted that the conventional definition of "starting materials" does not include "catalyst." If the Patent Office determines that a "catalyst" is a starting material, then the Patent Office must support the proposition that a catalyst is a "product." Such is not reasonably so. Even if a "catalyst" is a "starting material" (which it is not), then it is respectfully submitted that "starting materials" is a generic teaching and "catalyst" is a specific teaching, which paragraph [0044] does not teach.

Hence, applicant can find no disclosure in the Kubo reference as to the following requirement of independent claim 7:

wherein the catalyst-recovering step includes the step of obtaining a residue as left behind after distilling off the objective hydroxyalkyl (meth)acrylate from the resultant reaction liquid, with the production process further comprising the step of replenishing the resultant residue with a fresh catalyst to use the resultant mixture for the next reaction.

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That is to say, the Kubo reference discloses merely that a soluble metallic catalyst is caused to coexist with an anion-exchange resin during the reaction. On the other hand, independent claim 7 of the present application clearly includes the following two requirements: 1) "...includes the step of obtaining a residue as left behind after distilling off..." (after the reaction); and 2) "...comprising the step of replenishing the resultant residue with a fresh catalyst...". Thus, such claim 7 cannot be led from the Kubo reference.

Allowance of independent claim 7 is therefore respectfully requested.

#### I.3. Dependent claim 8

For the forgoing reasons, it is respectfully submitted that claims 2-3 and 5-7 are allowable. Thus it is respectfully submitted that multiple dependent claim 8, dependent upon each of claims 2-3 and 5-7, is allowable.

#### I.4. Summary

As to independent claim 2, applicant has identified four differences from the Kubo reference.

As to independent claim 5, the Kubo reference does not describe the final claimed element.


As to independent claim 7, the Kubo reference does not describe the final claimed element.

On the basis of the above, applicant respectfully submits that the present application is now in condition for allowance. The Examiner is respectfully invited to make contact with the undersigned by telephone if such would

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advance prosecution of this case.

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